

**Date: July 25, 2001**

**Attachment to Preliminary Amendment dated July 25, 2001**

**Marked-up Claims 1-22**

1. (Amended) Method of structuring surfaces of micro-mechanical and/or micro-optical components and/or functional elements [consisting] of glass-type materials, [with application of the following steps of operation] comprising:

- [- providing a first substrate; (2),]
- [- structuring at least one surface of [said] a first substrate in order to obtain recesses [(4)] on the at least one surface[,];
- [- providing a second substrate of glass-type material; (3),]
- [- joining said first substrate to [said] a second substrate of glass-type material, with the structured surface of said first substrate being joined to a surface of said [glass-type] second substrate of glass-type material in an at least partly overlapping relationship[,];
- [- annealing the joined first and second substrates [so bonded] in such a way that said glass-type material will flow into the recesses of said structured surface of said first substrate, structuring [hence that] a side of said second substrate which faces said first substrate[,]; and
- [- separating said second substrate from said first substrate.

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2. (Amended) Method of structuring surfaces of micro-mechanical and/or micro-optical components and/or functional elements [consisting] of glass-type materials, with application of the following steps of operation comprising:

- [- providing a first substrate; (2),]
- [- structuring at least one surface of [said] a first substrate in order to obtain recesses [(4)] on the at least one surface[,];
- [- providing a second substrate of glass-type material; (3),]
- [- joining said first substrate to [said] a second substrate of glass-type material, with the structured surface of said first substrate being joined to a surface of said glass-type second substrate in an at least partly overlapping relationship[,]; and
- [- annealing the joined first and second substrates [so bonded] in such a way that said glass-type material will flow into the recesses of said structured surface of said first substrate, structuring [hence that] a side of said second substrate which is turned away from said first substrate.

3. (Amended) Method of structuring surfaces of micro-mechanical and/or micro-optical components and/or functional elements consisting of glass-type materials, [with application of the following steps of operation] comprising:

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- [- providing a first substrate; (2),]
- [- structuring at least one surface of said first substrate in order to obtain recesses [(4)] on the at least one surface[,];
- [- providing a second substrate of glass-type material; (3),]
- [- joining said first substrate to [said] a second substrate of glass-type material, with the structured surface of said first substrate being joined to a surface of said glass-type second substrate in an at least partly overlapping relationship and with a gaseous medium being introduced into said recesses, which expands when heated[,];
- [- annealing the joined first and second substrates [so bonded] in such a way that due to the expansion of said gaseous medium within said recesses in said first substrate a local displacement of said glass-type material takes place, so that [the] a side of said second substrate [will be structured,] which faces said first substrate[,]is structured; and
- [- separating said second substrate from said first substrate.

4. (Amended) Method according to Claim 2,

[characterised in that] wherein said second substrate is separated from said first substrate.

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5. (Amended) Method according to Claim 1, [3 or 4,  
**characterised** in that the separation of] wherein said second substrate is separated from  
said first substrate [is realised] by removal of said first substrate by etching.

6. (Amended) Method according to [any of the Claims] Claim 1, [3 to 5,  
**characterised** in that] wherein the separation of said second substrate from said first  
substrate is [realised] produced by providing a parting layer between said first and second  
substrates[,] that is applied on said structured surface while maintaining the structure prior  
to joining both substrates and that is configured as sacrificial layer that will be destroyed  
by thermal and/or chemical action and permits a separation of both substrates from each  
other.

7. (Amended) Method according to Claim 6,  
[**characterized** in that] wherein a metal layer is employed as the parting layer, [whose] the  
metal layer having a melting point [is] below the melting points of said first and second  
substrates.

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8. (Amended) Method according to Claim 6,  
[characterised in that] wherein an [oxidisable] oxidizable layer is used as the parting layer,  
[which undergoes] the oxidizable layer undergoing a chemical reaction when oxygen and/or  
thermal energy is supplied.

9. (Amended) Method according to Claim 6,  
[characterised in that] wherein a carbon layer, a diamond layer, a diamond-type  
layer or SiC is used as the parting layer.

10. (Amended) Method according to [any of the Claims] Claim 1 [to 9],  
[characterised in that] wherein the structured surface of said first substrate presents the  
recesses having structure widths B while said second substrate presents a thickness D, and  
that the following approximate relationship applies:

$$B \geq 0.1 \cdot D_{\perp}$$

11. (Amended) Method according to [any of The Claims] Claim 1 [to 9],  
[characterised in that] wherein said first substrate is a semiconductor substrate [ands/or]  
and/or [that] said glass-type material is a borosilicate glass.

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12. (Amended) Method according to Claim [10] 11,  
[characterised in that] wherein said semiconductor substrate is a silicon substrate and/or  
that said borosilicate glass is Pyrex® glass.

13. (Amended) Method according to [any of the Claims] Claim 1 [to 12],  
[characterised in that] wherein the [step of] joining of said first substrate to said second  
substrate of glass-type material is carried out by anodic bonding.

14. (Amended) Method according to [any of the Claims] Claim 1, [2, or 4 to 13,  
characterised in that] wherein a negative pressure prevailing throughout the joining  
process is preserved, after joining, in the recesses of the surface of said first substrate,  
between said first substrate and said second substrate of glass-type material.

15. (Amended) Method according to [any of the Claims] Claim 1 [to 13],  
[characterised in that] wherein an overpressure acts upon the surface of said second  
substrate of glass-type material[, ] which is turned away from said first substrate[, ]  
throughout the annealing [process].

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16. (Amended) Method according to [any of the Claims ] Claim 1, [2 or 4 to 15, **characterised in that**] wherein the annealing process is carried out by controlling [the] temperature and [the] period in such a way that the inflow of said glass-type material into the recesses of said first substrate is stopped at a desired depth of inflow, without the [in-flown] glass-type material contacting [the] a bottom of said recesses.

17. (Amended) Method according to Claim [15 or] 16, [characterised in that] wherein at least one of the pressure during the annealing, [and/or] the temperature of the annealing [and/or] and the period of the annealing [process] are [so] selected that a relief moulding of the structured surface of said first substrate will be produced on the surface of said second substrate of glass-type material.

18. (Amended) Method according to [at least one of the Claims] Claim 1 [to 17], [characterised in that] wherein one surface of said glass substrate is planished by grinding and/or polishing after annealing or after removal of said first substrate by etching.



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19. (Amended) Method according to [any of the Claims] Claim 1, [3 to 18,  
**characterised** in that] wherein a third substrate is evenly applied on a side of said second  
substrate[,] which is turned away from said first substrate[,] prior to the annealing\_  
[process.]

20. (Amended) Method according to Claim 19,  
[**characterised** in that] wherein said third substrate is a semiconductor substrate.],  
preferably in the form of a silicon substrate.]

21. (Amended) Method according to Claim 19 [or 20],  
[**characterised** in that] wherein said third substrate is removed by an etching operation  
after the annealing process and that a planar surface is created on [that] a side of said  
second substrate which is turned away from said first substrate.

22. (Amended) Micro-mechanical component adapted to be manufacture in  
[correspondence] accordance with [any of the Claims 2, 4 to 16,  
**characterised** in that] Claim 2, wherein electrodes are arranged in the recesses formed in  
the course of the annealing [process] in said second substrate of glass-type material on

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[that] a side of the second substrate which is turned away from said first substrate, and that  
said recesses are spanned by an electrically conductive resilient membrane.

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